

**UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE**  
**Geneva, Switzerland**

**DISCUSSION PAPER SERIES**

**No. 2005.2**

September 2005

**DOMESTIC SAVINGS AND THE DRIVING  
FORCES OF INVESTMENT IN THE ECE  
EMERGING MARKET**

■ Rumen Dobrinsky



**UNITED NATIONS**

## Table of contents

Introduction .....	3
I. Domestic savings, investment and growth in the ECE emerging market economies .....	4
A. Some policy conclusions from the recent literature .....	4
B. Some empirical evidence about the ECE emerging market economies .....	5
II. The determinants of business investment in the ECE emerging market economies .....	11
III. Conclusions and policy implications .....	15
Annex table .....	17
Notes .....	19

## Abbreviations, acronyms and explanatory notes

CIS	Commonwealth of Independent States
ECE	Economic Commission for Europe
FDI	foreign direct investment
GDP	gross domestic product
EBRD	European Bank for Reconstruction and Development
NBER	National Bureau of Economic Research
PPP	purchasing power parity
UNECE	United Nations Economic Commission for Europe

The following symbols have been used throughout this publication:

..	= not available or not pertinent
–	= nil or negligible

In referring to a combination of years, the use of an oblique stroke (e.g. 1998/99) signifies a 12-month period (say, from 1 July 1999 to 30 June 2000). The use of a hyphen (e.g. 1999-2002) normally signifies either an average of, or a total for, the full period of calendar years covered (including the end-years indicated).

Unless the contrary is stated, the standard unit of weight used throughout is the metric ton. The definition of “billion” used throughout is a thousand million. The definition of “trillion” used throughout is a thousand billion. Minor discrepancies in totals and percentages are due to rounding.

References to dollars (\$) are to United States dollars unless otherwise specified.

### *Abstract*

*This paper discusses possible approaches for improving the mobilization of domestic resources for development in the ECE emerging market economies, focusing on the interrelationship between domestic saving, capital accumulation and economic growth. In particular, it highlights the possibility of creating a virtuous cycle of higher domestic saving and investment rates, and higher trend growth. The relevant empirical evidence for the ECE emerging market economies presented and discussed in the paper is in line with these theoretical findings. The paper also seeks to identify and analyse the determinants of business investment in the ECE emerging market economies on the basis of an econometric model of investment behaviour. The results of the econometric analysis highlight the importance of targeted and sequenced policy actions for the invigoration of productive investment in these economies. Moreover, the results hint at possible ways in which public policy could facilitate the emergence of the above-mentioned virtuous cycle of higher saving and investment rates, and higher trend growth.*

*One of the main policy areas for achieving this is the development of domestic financial systems, especially in the countries that are less advanced in their economic transformation. Improving financial intermediation can be a key factor for raising the level of domestic savings and for their efficient channelling into growth-enhancing investment. However, financial deepening has to reach a certain level before the financial system can intermediate efficiently in channelling savings into productive investment. Hence, assigning high priority to financial reforms in the ECE emerging market economies, especially in those that have not made sufficient progress in this area, may have a mutually reinforcing effect on domestic savings, investment and growth. Another policy area is the strengthening of the institutional and regulatory environment, including contract enforcement, protection of property rights, promotion of fair competition in domestic markets and transparency in public administration. Such policies will also be instrumental in attracting more foreign resources (in particular, FDI) for productive use in the domestic economy. The paper draws attention to the fact that some of the resource-rich economies of the Commonwealth of Independent States (CIS) underutilize their available domestic resources.*

## **Introduction**

The Monterrey Consensus that emerged from the International Conference on Financing for Development in March 2002 called for mobilizing and increasing the effective use of financial resources in pursuit of internationally agreed development goals, including those contained in the Millennium Declaration.<sup>1</sup> This was considered one of the leading actions needed for achieving those goals. This paper addresses some aspects of the mobilization of domestic financial resources for development in the ECE emerging market economies, focusing on the interrelationship between national savings, domestic investment and economic growth in these countries.

Both the theoretical and the empirical economic literature emphasize the role of national savings in influencing the pace of fixed investment in an economy. An issue of the *Economic Survey of Europe* analysed in detail the dynamics and patterns of national savings, as well as their main determinants in the east European and CIS economies.<sup>2</sup> This paper now looks at the role of domestic savings in capital accumulation in the same group of countries, and seeks to identify the major drivers of productive investment.

---

\* Rumen Dobrinsky ([rumen.dobrinsky@unece.org](mailto:rumen.dobrinsky@unece.org)) United Nations Economic Commission for Europe. This paper is also available in a published pamphlet available from the United Nations Bookshop ([unpubli@unog.ch](mailto:unpubli@unog.ch)) as UNECE Occasional Paper No. 4 (2005), Sales No. E.05.II.E.12, ISBN 92-1-116926-7.

Capital investment plays a key role in promoting economic development and growth, especially as an instrument of technological change. The experience of the ECE countries that undertook the transformation from planned to market economies, notably through the creation of competitive economic structures, provides ample evidence of the fundamental role of productive investment in this process. The countries that were more successful in economic transformation and growth were also those that managed to make greater progress in restructuring their productive capacity on the basis of new capital investment. Section I looks at the recent dynamics of the saving-investment balances in the ECE emerging market economies and presents a brief analytical overview of their patterns of investment and growth.

Economy-wide capital accumulation is a complex process of channelling domestically generated and/or externally mobilized resources into productive use. The intensity and speed of capital accumulation are driven by a multitude of factors related to the economic fundamentals as well as the institutional, political and social environment of a country. Section II explores how some of these factors have affected the dynamics of business investment in the ECE emerging market economies, and seeks to identify areas of possible policy intervention that could stimulate capital accumulation.

The empirical analysis reported in the study provides new insights into the process of capital accumulation in these economies and the relationship between national savings, domestic investment and economic growth. It also highlights the role of some key determinants of productive investment. These results allow some conclusions to be drawn regarding the role of public policy in capital accumulation and growth in these economies, which are summarized in section III.

## **I. Domestic savings, investment and growth in the ECE emerging market economies**

### **A. Some policy conclusions from the recent literature**

The relationship between savings, investment and growth has been thoroughly analysed in the theoretical and empirical literature.<sup>3</sup> The “conventional wisdom” about these links is that thrift is a major determinant of long-term economic growth, which in turn is related to the conjecture that in the long run there must exist an expected positive return on the invested capital, regarded as “the reward for parsimony”.<sup>4</sup> In the main, empirical research has provided convincing evidence in support of this assumption, in particular as regards long-term economic performance.<sup>5</sup> One important empirical finding is that the causality in this relationship can run in both directions: there exists a positive causality both from savings to economic growth and from economic growth to savings. Recent research suggests that the causal relationship between savings and growth can also be affected by other factors such as habit formation in consumption patterns, as well as public policy and technological progress.<sup>6</sup>

The economic literature suggests various mechanisms through which national savings can affect growth, but one of the main transmission channels is from savings to fixed capital accumulation. Indeed, empirical research has systematically come up with the robust finding of a strong positive correlation between domestic savings and capital accumulation.<sup>7</sup> While there is an ongoing debate about the causes of this relationship and the transmission channels, the notion of the supportive role of national savings in fixed capital accumulation continues to enjoy wide appeal among economists and policy makers.

The extent to which the level of savings can affect capital accumulation, and hence growth, largely depends on the capacity of the economy to channel the savings into productive use. It also depends on the efficiency of this process. The system of financial intermediation can affect economic performance and growth directly through the role it plays in resource allocation. In particular, the financial system can affect saving and investment decisions (and hence capital accumulation and technological innovation) by reducing information and transaction costs, creating mechanisms of risk-sharing, facilitating trade and payments among economic agents and providing various supporting

services.<sup>8</sup> If efficient, financial intermediation will channel savings into the most productive investment projects, and will thus contribute to higher rates of aggregate growth. Conversely, inefficient intermediation may reduce the allocative efficiency of resources, which ultimately could result in lower rates of aggregate growth. However, a well functioning system of financial intermediation can also affect economic growth indirectly through its positive impact on the level of national savings, by allowing the mobilization and channelling of larger amounts of resources into productive use.

Turning to the relationship between capital accumulation and economic growth, the conventional wisdom, as noted above, is centred on the view that capital accumulation drives growth. However, in the traditional, neoclassical growth models, a rise in the savings/investment rate does not affect the equilibrium rate of growth, but only the rate of growth during the transition from one steady state to another. Some extensions of the neoclassical model, assuming increasing returns to scale (an assumption that may be relevant for developing economies), suggest the existence of multiple equilibria. Under these assumptions, an initial rise in the level of national savings may drive the economy to a more stable equilibrium of higher growth.<sup>9</sup>

The more recent “endogenous growth theory” subsumes a link between investment and the level of productive efficiency, and stresses the role of human capital. According to this strand of literature, the two main transmission channels through which fixed capital formation affects growth are: i) the increased stock of physical capital in the economy (direct effect), and ii) the technological upgrading associated with the investment (indirect effect).<sup>10</sup> However, capital accumulation is a necessary, but not sufficient, condition for long-term growth; the sustainability of growth depends on other additional factors, such as the levels of human capital and technological knowledge in the economy as well as the quality and structural characteristics of the new investment, in particular its potential to enhance productive efficiency.<sup>11</sup> The past experience of the former centrally planned economies is a blatant example of wasteful accumulation of unproductive physical capital.

Empirical research generally finds a positive association between capital accumulation and long-term economic growth, a finding that is broadly in conformity with the conclusions of the endogenous growth theory.<sup>12</sup> In addition, recent empirical research based on a cross-section of countries has revealed strong evidence that the causality between investment and long-term growth may also run in both directions.<sup>13</sup> These findings are in line with the argument (raised in some endogenous growth models) that investment-induced technological innovation further drives both output and capital accumulation. Furthermore, single-country studies suggest that the direction of causality may vary among countries, or it may change over time. This implies that other factors (such as public policy) may partly offset the fundamental causality effects.<sup>14</sup> At the same time, recent empirical research suggests that the accumulation of physical capital alone may not be sufficient to trigger growth in developing economies, unless it is matched by an adequate level of human capital and is backed by a conducive institutional environment.<sup>15</sup>

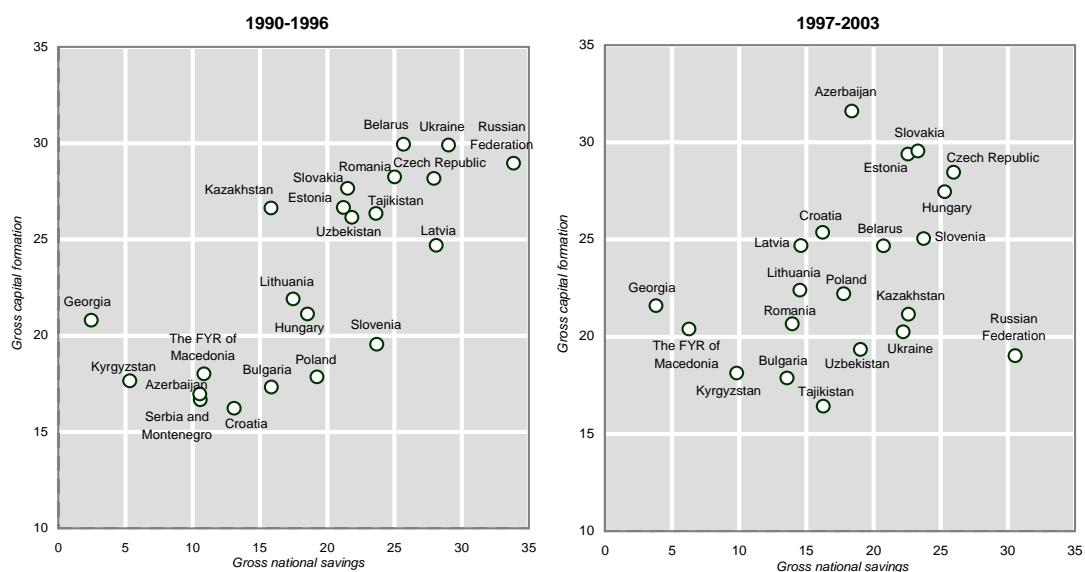
## **B. Some empirical evidence about the ECE emerging market economies**

There still exist significant gaps in per capita GDP levels between the ECE emerging market economies and the more developed western European economies. A significant reduction in those gaps will require a protracted catch-up process, which implies that these emerging market economies will have to sustain relatively high rates of economic growth (and higher than those of the more advanced countries) for a sufficiently long period of time. One of the central policy-related issues is whether public policy can support or help accelerate such a process of catching up. In this regard, the relationship between savings, investment and growth in these economies may have important policy implications.

The empirical overview presented below (compiled by the UNECE secretariat on the basis of national statistics and reported in the annex table to this paper), makes extensive use of aggregate saving-investment balances in the ECE emerging market economies.<sup>16</sup> The overview of the relationship between savings, investment and economic growth also draws on supplementary data

CHART 1

Gross national savings and gross capital formation in selected ECE emerging market economies, 1990-2003  
(Per cent of GDP, period average)



Source: UNECE secretariat calculations, based on national statistics.  
Note: Countries with negative national savings are not shown in the chart.

available in the UNECE macroeconomic statistical database. Most of these data cover the period between 1990 (the start of economic transformation) and 2003, and thus provide a solid basis for statistical analysis.<sup>17</sup>

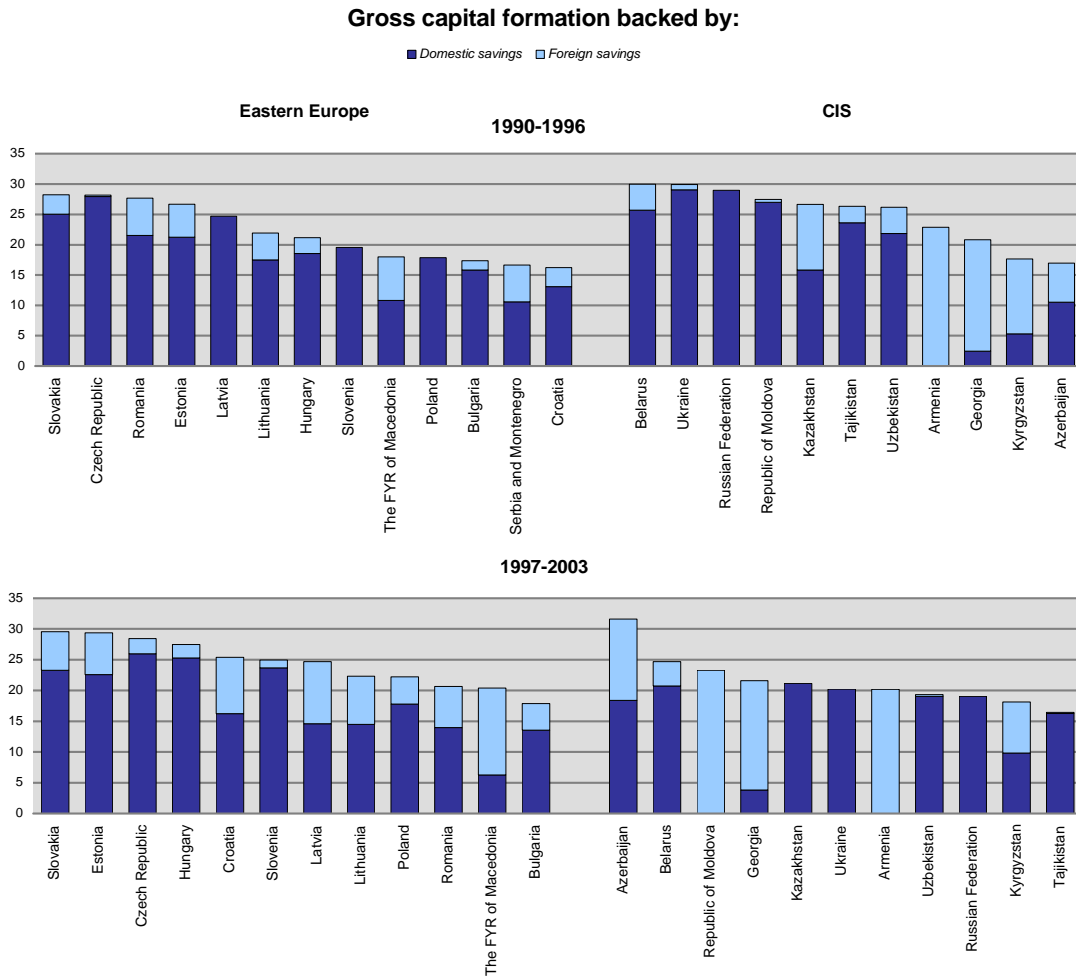
Overall, the available statistical evidence for the ECE emerging market economies is in line with the main theoretical and empirical findings regarding the relationship between domestic savings, investment and growth outlined above. In particular, the data suggest a relatively strong positive correlation between the rates of national savings and investment (as measured by gross capital formation) (chart 1). Over the period of economic transformation, however, this correlation has weakened somewhat for the group of ECE emerging market economies as a whole.<sup>18</sup> This outcome largely reflects their heterogeneous performance patterns as well as their different policy courses during this period. It may also suggest the effect of increased capital mobility as a result of the further opening up of these economies.

Chart 2, which illustrates the sources of financing of gross domestic capital formation, provides further evidence to this effect, and also highlights some important cross-country differences. The east European economies relied, on average, more than the CIS on national savings as sources of financing their domestic investment. Thus for the period 1990-2003 as a whole, on average 81 per cent of gross capital formation in the east European economies was backed by national savings, whereas the corresponding share for the CIS economies was 65 per cent.<sup>19</sup> At the same time, all the east European economies financed part of their gross capital formation by mobilizing, in addition, some foreign savings in the form of capital inflows, and the reliance on foreign savings increased during the period 1997-2003 compared to 1990-1996. This was not the case in the CIS, where a number of countries financed their gross capital formation entirely by national savings. Despite the existing differences across countries and subregions, these results generally underscore the importance of national savings for supporting domestic investment in the ECE emerging market economies.

Within the CIS, there was no uniform pattern with regard to the degree of reliance on national savings; indeed, it is possible to identify two extremes in the relationship between savings and

CHART 2

Gross capital formation and its sources of financing in selected ECE emerging market economies  
(Per cent of GDP)



Source: UNECE secretariat calculations, based on national statistics.

Note: The countries in each subregion are shown in the descending order of their gross investment ratios.

investment in this region. On the one hand, some countries saved more than they invested domestically, and hence exported capital (in 1997-2003 these were Kazakhstan, the Russian Federation, Tajikistan and Ukraine). On the other hand, in countries such as Armenia and the Republic of Moldova, national savings in the same period were on average negative, which implies that gross capital formation was entirely financed by foreign capital inflows. Notably, during the second sub-period (1997-2003), the divergence in saving and investment patterns among the CIS economies increased compared to 1990-1996. This divergence largely reflects differences in the structural features of these economies. Those that exported capital are among the resource-rich economies, and their current account surpluses reflect large and increasing revenues from the export of natural resources. In contrast, the countries that relied exclusively on attracting capital from abroad are among the less developed and are poor in natural resources. Nevertheless, even the resource-rich CIS economies could, in principle, benefit from a higher degree of absorption of the national savings that they generate, if these were to be channelled into productive investment. Notably, policies targeting the establishment of an environment conducive to entrepreneurship could play a beneficial role in raising the level of domestic investment in these countries.

Chart 3 illustrates the correlation between fixed investment and economic growth for the ECE emerging market economies as a whole for the period 1995-2003. This relationship is positive –



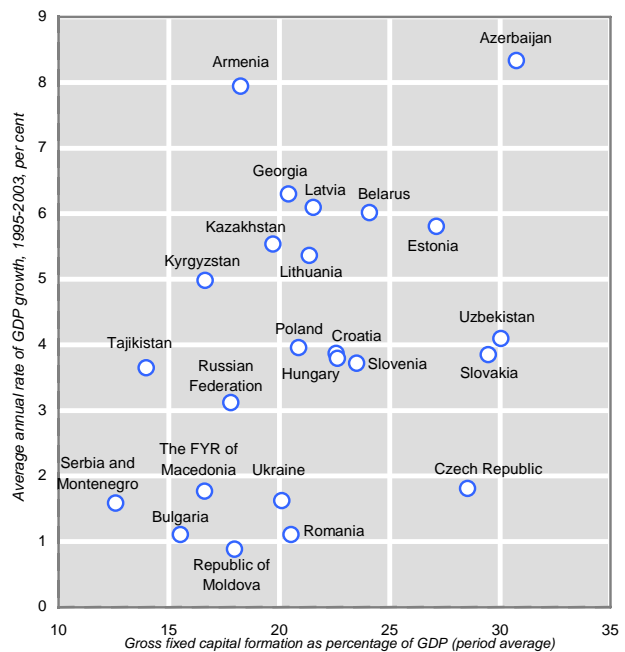
albeit rather weak – in line with theory and with the results of similar studies for other groups of countries.<sup>20</sup> In general, by highlighting this positive relationship, these results suggest that virtuous cycles of high saving and investment rates, and fast growth are a plausible scenario for this group of countries.

The recent trends in investment activity in the ECE emerging market economies can be traced in the dynamics of their gross investment ratios reported in the annex table.<sup>21</sup> A broader picture of investment activity in these countries over the whole period, 1990-2003, is presented in chart 4, which shows the average share of gross fixed capital formation in GDP in the two main subregions: eastern Europe and the CIS. Notably, the chart reflects the pro-cyclical pattern of fixed investment throughout eastern Europe and the CIS during the transition period. Thus the transformational recession in the initial phase of transition had a disproportionately negative effect on investment activity, which is reflected in the declining investment ratios. Conversely, the post-recession recovery (which started in eastern Europe in the mid-1990s, and in the CIS only after the Russian financial crisis of 1998) was accompanied by a robust upturn in investment activity. Partly reflecting the earlier start of recovery, since 1997, but, as discussed below, also the different composition of investment, the east European economies have been channelling, on average, 2 to 4 percentage points more of their GDP into fixed investment than the countries of the CIS.<sup>22</sup>

As noted, it is not only the quantity of fixed investment that matters for development and growth, but also its structure, quality and efficiency as a carrier of technological progress. Table 1 and chart 5

CHART 3

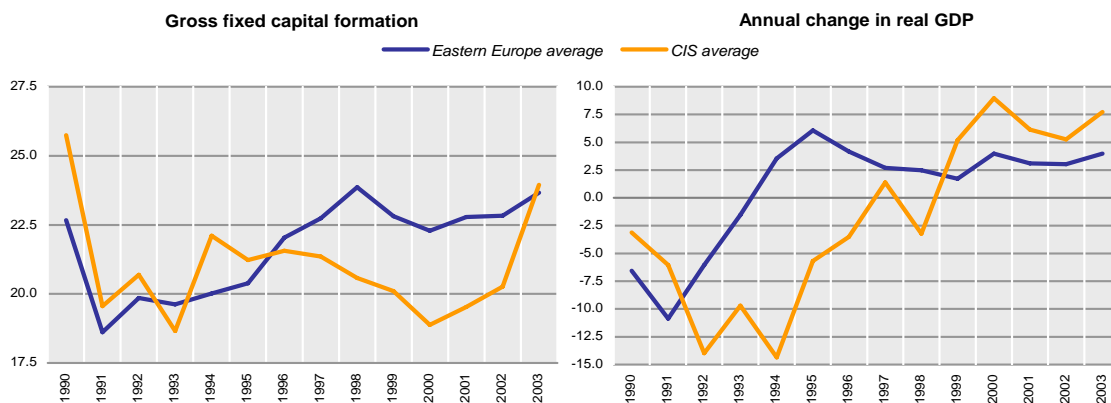
Fixed investment and economic growth in selected ECE emerging market economies, 1995-2003  
(Per cent)



Source: UNECE secretariat calculations, based on national statistics.

CHART 4

Gross fixed capital formation and GDP growth in eastern Europe and the CIS, 1990-2003  
(Per cent of GDP, per cent per annum)



Source: UNECE secretariat calculations, based on national statistics.

TABLE 1

Gross fixed capital formation by major sectors of economic activity in selected ECE emerging market economies,  
1992, 1997 and 2002

(Per cent of total gross fixed capital formation)

	1992	1997	2002		1992	1997	2002
<b>Bulgaria</b>				<b>Slovakia</b>			
Agriculture .....	4.9	2.9	2.5	Agriculture .....	4.5	3.3	3.5
Industry .....	51.2	35.5	33.9	Industry .....	47.7	36.1	39.0
Construction .....	3.4	7.0	6.0	Construction .....	3.3	2.7	0.8
Wholesale and retail trade .....	11.4	10.6	20.1	Wholesale and retail trade .....	4.6	8.6	6.3
Transport, communications .....	8.4	21.6	22.5	Transport, communications .....	9.1	11.7	14.3
Other services .....	20.8	22.5	15.0	Other services .....	30.8	37.5	36.0
<b>Croatia</b>				<b>Slovenia</b>			
Agriculture .....	6.7	3.0	3.3	Agriculture .....	2.3	1.2	1.0
Industry .....	30.6	32.0	26.6	Industry .....	36.8	37.1	35.8
Construction .....	1.7	4.0	8.9	Construction .....	1.8	3.2	3.1
Wholesale and retail trade .....	8.1	9.9	16.8	Wholesale and retail trade .....	12.6	13.9	14.1
Transport, communications .....	27.7	13.2	11.6	Transport, communications .....	15.5	12.7	12.2
Other services .....	25.2	37.8	32.6	Other services .....	31.1	31.9	33.8
<b>Czech Republic</b>				<b>Belarus</b>			
Agriculture .....	4.0	3.7	2.7	Agriculture .....	19.7	6.8	5.4
Industry .....	42.9	34.7	32.3	Industry .....	25.0	32.3	32.3
Construction .....	2.4	3.3	3.4	Construction .....	2.9	1.5	2.1
Wholesale and retail trade .....	3.9	8.7	9.1	Wholesale and retail trade .....	1.7	3.2	4.2
Transport, communications .....	11.0	17.3	18.2	Transport, communications .....	9.8	16.8	18.0
Other services .....	35.8	32.2	34.2	Other services .....	40.7	39.4	38.0
<b>Hungary</b>				<b>Georgia</b>			
Agriculture .....	3.4	3.6	3.0	Agriculture .....	17.1	-	0.3
Industry .....	30.9	31.6	29.4	Industry .....	31.5	30.5	21.0
Construction .....	1.8	1.9	2.2	Construction .....	3.0	2.6	22.9
Wholesale and retail trade .....	7.0	7.9	8.2	Wholesale and retail trade .....	2.6	2.3	5.1
Transport, communications .....	17.6	17.2	15.3	Transport, communications .....	12.4	42.9	38.6
Other services .....	39.4	37.8	41.9	Other services .....	33.4	21.8	12.1
<b>Lithuania</b>				<b>Kazakhstan</b>			
Agriculture .....	6.8	2.8	2.1	Agriculture .....	27.7	1.9	1.5
Industry .....	33.6	28.7	28.6	Industry .....	31.9	58.6	53.5
Construction .....	0.8	1.9	2.7	Construction .....	2.7	2.7	4.6
Wholesale and retail trade .....	4.9	8.7	16.9	Wholesale and retail trade .....	1.3	2.0	4.5
Transport, communications .....	17.4	30.9	20.1	Transport, communications .....	4.5	11.6	11.1
Other services .....	36.5	27.0	29.5	Other services .....	31.9	23.2	24.9
<b>Poland</b>				<b>Russian Federation</b>			
Agriculture .....	3.7	2.9	2.0	Agriculture .....	12.3	2.9	3.0
Industry .....	39.0	39.4	30.6	Industry .....	37.6	34.8	42.6
Construction .....	4.3	6.3	7.2	Construction .....	3.2	4.1	2.9
Wholesale and retail trade .....	6.5	9.3	11.5	Wholesale and retail trade .....	1.4	2.3	2.2
Transport, communications .....	8.8	12.1	11.5	Transport, communications .....	9.8	17.0	24.6
Other services .....	37.8	30.1	37.2	Other services .....	35.7	38.9	24.8
<b>Romania</b>				<b>Ukraine</b>			
Agriculture .....	9.3	8.3	9.0	Agriculture .....	20.5	7.0	5.3
Industry .....	53.7	44.9	39.3	Industry .....	31.3	40.4	40.6
Construction .....	2.5	7.2	6.5	Construction .....	3.2	1.6	4.9
Wholesale and retail trade .....	6.9	10.2	12.2	Wholesale and retail trade .....	2.1	1.5	6.6
Transport, communications .....	12.0	11.7	18.9	Transport, communications .....	6.9	15.4	18.8
Other services .....	15.7	17.7	14.1	Other services .....	36.1	34.1	23.7

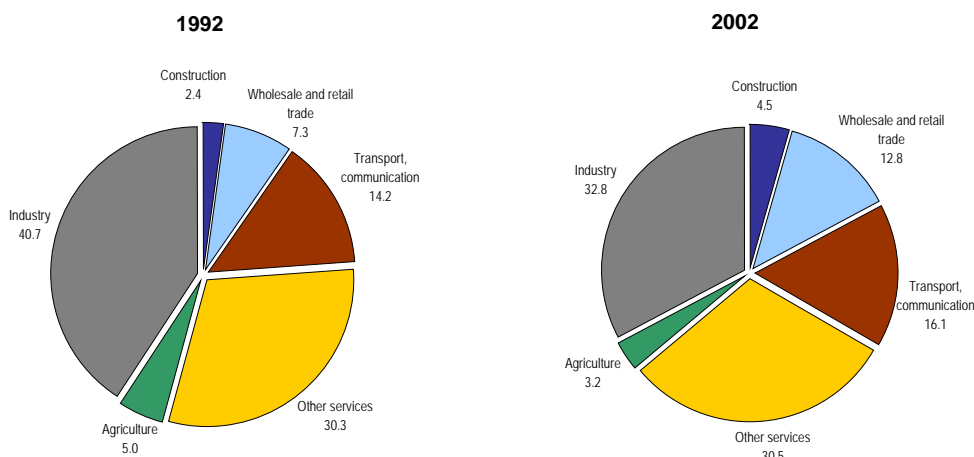
Source: UNECE secretariat, based on national statistics.

Note: Whenever available, three-year moving averages are shown for each year.

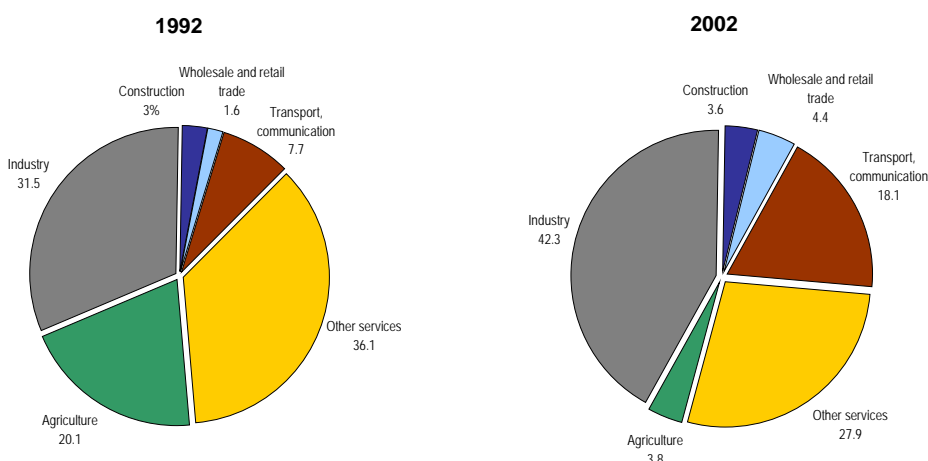
CHART 5

Breakdown of gross fixed capital formation by major sectors of economic activity in eastern Europe and the CIS, 1992 and 2002  
(Per cent of total)

Eastern Europe average



CIS average



Source: UNECE secretariat calculations, based on national statistics.

present a rough picture of the changes in the composition of gross fixed capital formation in the ECE emerging market economies during the period 1992-2002. These data illustrate the important structural changes that took place during their transition from planned to market economies. Again, judging from both individual country data and from the average figures by subregions, the pattern of change in eastern Europe was somewhat different from that in the CIS. Throughout eastern Europe, over the 10-year period, there was a general shift in the direction of new investment from manufacturing towards services. While there were important specificities across countries (for example, related to the share of investment going to different types of service activities or to the agricultural sector), this general pattern of change in the composition of fixed investment could be observed in all the eastern European economies. This shift also mirrored the faster expansion of their tertiary activities during the transition period.

As for the CIS, probably the most striking feature of the compositional changes in investment between 1992 and 2002 was the considerable increase in the share of industrial

investment, on average by more than 10 percentage points (chart 5). This shift mainly reflects the dramatic fall in investment in agriculture, and only a slight increase, on average, in the share of investment in services. However, there were significant changes in the shares of investment going to different service activities, the largest being in transport and communications. The growing share of industrial investment mainly reflects the increasing and excessive reliance of these economies on the extraction of natural resources; it is these activities in the resource-rich CIS economies that have attracted the most investment (both domestic and foreign) in the last decade. Compared to the east European economies, less investment has gone to business services and to high value added manufacturing activities. Their strong reliance on natural resources, however, makes these countries vulnerable to downturns in world commodity markets and undermines their capacity to sustain high rates of economic growth in the long run.

## **II. The determinants of business investment in the ECE emerging market economies**

The general overview presented in the previous section suggests that investment patterns have varied considerably across the ECE emerging market economies. This raises the question as to the factors that shape these divergent patterns. The analysis of the factors that drive capital formation has important policy implications, as economic policies that stimulate business investment could ultimately have a positive impact on economic growth. This section seeks to provide some clues about the determinants of capital formation in the ECE emerging market economies, focusing on one of its main components: business investment.

Most of the theoretical models of investment are essentially of a microeconomic nature, and describe the investment behaviour of individual firms. However, assuming that these models describe the behaviour of representative firms in the economy, they could also be applied to the modelling of aggregate investment performance at the macro level. This is the approach that has been adopted in this study, on the basis of an extension of some widely used models of firm investment (see box 1 for the conceptual framework). It should be emphasized that, in contrast to the focus on the medium- and long-term relations between investment and growth in the previous section, this model essentially analyses the role of some of the factors that drive investment in the short run.

The model described in box 1 treats aggregate business investment (the share of gross investment by the non-government sector in GDP being used as a proxy) as a function of real GDP growth, the change in the real interest rate on short-term credit, the level of national savings (as a percentage of GDP), the level of net capital inflows (as a percentage of GDP), the level of monetization in the economy (the share of broad money in GDP) and the progress in economic transformation (measured as the change in the index of “progress in transition” as reported by the European Bank for Reconstruction and Development (EBRD)).<sup>23</sup> To take into account the possible common time-varying shocks, time dummies have also been included in the specification. Notably, this specification deviates significantly from the standard investment models that link investment only to the expected changes in output and to the real cost of capital. One of the problems with the conventional models of investment with respect to emerging market economies is that they fail to take into account the impact of important aspects of the business environment and the decision-making process that are particularly significant for these economies. Among these aspects, mention should be made of the possible existence of severe financing constraints that affect firms’ decisions, as well as the high degree of uncertainty about future returns on investment, typical of immature markets.<sup>24</sup> The suggested modelling framework is more in line with the recently developed “option approach” to modelling investment decisions, an approach that seeks to take into account the importance of such factors in shaping investment decisions.<sup>25</sup>

### Modelling aggregate business investment

The starting point for modelling aggregate business investment is the investment behaviour of the corporate sector. One of the more widely used business investment models is the so-called accelerator model, which suggests that a firm's required level of investment depends on the expected change in its output. Using this model, it can be shown that, under certain assumptions, the desired capital stock for a firm in period  $t$  can be described as:<sup>1</sup>

$$k_t = \alpha + y_t - \beta r_t \quad (1)$$

where  $k_t$  is the logarithm of the desired capital stock,  $y_t$  is the logarithm of output, and  $r_t$  is the logarithm of the real user cost of capital, and  $\alpha$  and  $\beta$  are constants related to the underlying production technology. The interpretation is that the desired stock of capital depends positively on demand for output and negatively on the user cost of capital. Taking differences first and approximating  $\Delta k_t$  with the investment rate  $S_t = I_t/K_t$  (where  $I_t$  and  $K_t$  are the levels of investment and capital stock at time  $t$ , respectively) yields the basic investment accelerator equation:

$$S_t = I_t/K_t = \Delta y_t - \beta \Delta r_t \quad (2)$$

This equation can be extended to incorporate dynamic adjustment effects by taking the lagged values of the main independent variables.

In the presence of credit market imperfections – as is likely to be the case in emerging market economies – firms are likely to face financing constraints which may affect their investment behaviour. In both the theoretical literature and in empirical studies this issue is usually addressed by incorporating variables reflecting such constraints into the conventional models of enterprise investment.<sup>2</sup> Including such a variable ( $C_t$ ) and adding an error term  $\varepsilon_t$  yields the following estimable form of the equation with dynamic adjustment effects:

$$S_t = a_0 + a_1 \Delta y_t + a_2 \Delta y_{t-1} + a_3 \Delta r_t + a_4 C_t + \varepsilon_t \quad (3)$$

By aggregating the individual corporate entities, equation 3 can be generalized to describe the investment behaviour of the corporate sector as a whole. In this case the variables entering the equation will be substituted by the corresponding macroeconomic variables. Thus one could approximate total corporate investment by non-government gross domestic investment/gross capital formation (see the annex table to this chapter), and aggregate output by GDP. One problematic variable is the aggregate fixed capital stock of the corporate sector, the denominator of the investment rate in equation (2), as such data are generally not available. A practical way to deal with this issue could be to assume that the aggregate capital-output ratio does not change significantly over a relatively short period of time such as several years. In this case, one could use the ratio of non-government gross investment to GDP as a proxy for the true investment rate. A macro indicator roughly reflecting the user cost of capital could be the average real interest rate on corporate credit.

Several macroeconomic variables could be suggested to reflect the availability of external sources of investment finance for the corporate sector. The most obvious one is the level of gross national savings, which, as argued throughout this chapter, is considered a key driver of domestic investment. In an open economy, the domestically available resources for investment can be supplemented by resources attracted from abroad. These could be approximated by the net capital inflow, as measured in the balance of payments.<sup>3</sup> Another factor that affects the availability of investment finance is financial development and the efficiency of financial intermediation. The level of monetization (the share of broad money in GDP) is a variable often used as a proxy for this factor.

In addition, as discussed earlier, investment decisions can be affected by changes in the institutional environment. Given the nature of the ongoing reforms in the ECE emerging market economies, the aggregate “progress in transition” index compiled by EBRD could be used to capture the effect of this factor.

Thus the estimable equation takes the following final form:

$$S_t = a_0 + a_1 \Delta y_t + a_2 \Delta y_{t-1} + a_3 \Delta r_t + a_4 DS_t + a_5 CF_t + a_6 BM_t + a_7 \Delta PT_t + \varepsilon_t \quad (4)$$

where  $S_t$  is the share of gross investment by the non-government sector in GDP in year  $t$ ;  $\Delta y_t$  is the rate of change of GDP in year  $t$ ;  $\Delta r_t$  is the change in the real interest rate on corporate credit in year  $t$ ;  $DS_t$  is the national savings rate in year  $t$ ;  $CF_t$  is the net capital inflow as a percentage of GDP in year  $t$ ;  $BM_t$  is the share of broad money in GDP in year  $t$ ; and  $\Delta PT_t$  is the change in the EBRD aggregate index of “progress in transition” in year  $t$ .

<sup>1</sup> The version used in this study is based on derivations suggested in S. Bond, J. Elston, J. Mairesse and B. Mulkey, *Financial Factors and Investment in Belgium, France, Germany and the UK: A Comparison Using Company Panel Data*, NBER Working Paper, No. 5900 (Cambridge, MA), January 1997; and E. Bertero and L. Rondi, “Does a switch of budget regimes affect investment and managerial discretion of state-owned enterprises? Evidence from Italian firms”, *Journal of Comparative Economics*, Vol. 30, No. 4, December 2002, pp. 836-863.

<sup>2</sup> For an overview of the approaches to dealing with financing constraints in investment models, see S. Fazzari, R. Glenn Hubbard and B. Petersen, “Financing constraints and corporate investment”, *Brookings Papers on Economic Activity*, 1 (Washington, D.C.), 1988, pp. 141-195; and R. Glenn Hubbard, “Capital market imperfections and investment”, *Journal of Economic Literature*, Vol. 36, No. 1, March 1998, pp. 193-225.

<sup>3</sup> The use of the current account balance (which is the true measure of attracted foreign savings) as an independent variable in this equation would not be appropriate due to the existence of reverse causality between aggregate investment and the level of the current account balance.

Thus, as argued in box 1, the inclusion in the specification of variables such as national savings and net capital inflows is intended to capture the incidence of financing constraints that affect investment decisions (and hence the aggregate level of investment in an economy). Notably, the intensity of net capital inflows also reflects foreign investors’ perception of the business environment and investment opportunities in the country concerned. However, the availability of external financial resources is a necessary but not sufficient condition for boosting investment in financially constrained firms, as the access to such resources depends on the extent of development of financial intermediation in the economy. Bringing the “level of monetization” variable into the specification is intended to capture the development and efficiency of financial intermediation.<sup>26</sup> Finally, the change in the EBRD’s “progress in transition” index is taken as a broad measure of the development of the institutional environment in the ECE emerging market economies. The signs and the statistical significance of the estimated coefficients of these variables can be interpreted in terms of the importance of the corresponding factor in shaping investment decisions.

The investment model specified above has been estimated on the basis of data for the ECE emerging market economies for the period 1995-2003, for all countries for which the data were available. Table 2 provides an overview of the descriptive statistics for the variables used in the model. The model was estimated for all ECE emerging market economies as a whole as well as separately for the subregions: “eastern Europe” and “CIS”. Some of the main estimation results are reported in table 3.<sup>27</sup>

Overall, the estimation results are in conformity with the priors drawn from the theoretical model used. The coefficients of the main variables derived from the accelerator model of investment demand (the changes in activity levels and real interest rates) have the correct signs; and the coefficients of the activity variables in most cases are statistically significant.<sup>28</sup> Judging from the values and statistical significance of the estimated coefficients, the real interest rate on commercial credit does not appear to have had a strong effect on investment decisions in the ECE emerging market economies; other factors seem to be much more important.<sup>29</sup> Due to this outcome, the investment equation has also been estimated without the interest rate variable, which allows an extension of the estimation period.<sup>30</sup>

TABLE 2

## The investment equation for the ECE emerging market economies, descriptive statistics, 1995-2003

Variable	All ECE emerging market economies		Eastern Europe		CIS	
	Unweighted average	Standard deviation	Unweighted average	Standard deviation	Unweighted average	Standard deviation
Non-government gross investment (as a per cent of GDP) .....	19.4	5.1	20.5	4.3	18.0	5.7
Annual rate of growth of real GDP (per cent) .....	4.2	4.2	3.6	3.2	5.0	5.1
Change in the average annual real interest rate on short-term credits (per cent) .....	-2.1	18.2	-0.4	14.5	-4.4	23.2
Gross national savings (as a per cent of GDP) .....	16.4	9.9	18.1	6.1	13.6	5.3
Net capital inflows (as a per cent of GDP) .....	2.4	2.1	3.3	1.9	1.3	1.8
Level of monetization (broad money) (as a per cent of GDP) .....	27.1	17.1	37.2	16.0	14.0	13.1
Change in the EBRD index of "progress in transition" (per cent) .....	1.6	5.6	1.1	4.8	2.2	6.4

Source: UNECE secretariat calculations, based on national statistics.

Note: "Eastern Europe" comprises: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia and The former Yugoslav Republic of Macedonia; the "CIS" comprises Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, the Republic of Moldova, the Russian Federation, Tajikistan and Ukraine; "all ECE emerging market economies" consists of all of the above. The country coverage has been determined exclusively by the availability of statistical data.

TABLE 3

## The determinants of business investment in the ECE emerging market economies: estimation results, 1995-2003

(Dependent variable: non-government gross investment as per cent of GDP)

Number of observations: Time period:	All ECE emerging market economies				Eastern Europe			CIS	
	145 1997-2003	183 1995-2003	145 1997-2003	183 1995-2003	83 1997-2003	106 1995-2003	106 1995-2003	62 1997-2003	62 1997-2003
<b>Independent variables:</b>									
Annual rate of growth of real GDP .....	0.114*	0.133*	0.246**	0.251**	0.338**	0.433**	0.490**	-0.117	0.010
	(2.08)	(2.35)	(4.97)	(4.63)	(3.977)	(6.11)	(7.84)	(-1.27)	(1.15)
Annual rate of growth of real GDP (lagged) .	0.269**	0.114**	0.201**	0.086	0.372**	0.213**	0.159**	0.282**	0.173
	(5.75)	(2.59)	(3.76)	(1.84)	(6.26)	(3.65)	(2.67)	(3.62)	(1.88)
Change in the real interest rate on short-term credits .....	-0.016*		-0.002		-0.016			-0.004	-0.007
	(-1.97)		(-0.21)		(-1.32)			(-0.31)	(-0.47)
Gross national savings .....	0.284**	0.255**			0.141	0.192*		0.391**	
	(6.64)	(5.77)			(1.61)	(2.30)		(5.58)	
Gross national savings (instrumented) <sup>a</sup> .....			0.467**	0.436**			0.505**		0.582**
			(4.83)	(5.03)			(4.23)		(3.62)
Net capital inflows .....	0.829**	0.859**	0.681**	0.659**	0.400**	0.404**	0.396**	2.03**	1.349**
	(6.52)	(6.69)	(5.94)	(5.46)	(2.98)	(3.10)	(3.39)	(4.85)	(3.38)
Level of monetization (broad money) .....	0.052	0.118**	0.084*	0.136**	0.240**	0.156**	0.184**		
	(1.02)	(3.91)	(2.24)	(4.38)	(4.22)	(4.14)	(6.20)		
Change in the EBRD index of "progress in transition" .....								0.159	0.093
								(2.49)	(1.35)
Adjusted R-squared (weighted) .....	0.958	0.929	0.966	0.924	0.959	0.929	0.930	0.963	0.967

Source: UNECE secretariat calculations, based on national statistics.

Note: t-statistics in parentheses; \*\* – significant at the 1 per cent significance level; \* – significant at the 5 per cent significance level. The different estimation periods reflect the availability of data for some of the variables used. The estimated country-specific fixed effects and regional time trends are not reported in the table. For coverage of regions see the note to table 7.3.1.

<sup>a</sup> In some estimations the original variable "gross national savings" has been substituted by a proxy based on instrumental variables (for details see text).

It is the variables extending the conventional investment model that cast light on the most interesting aspects of business investment performance in the ECE emerging market economies. One of the robust outcomes that shows up throughout the entire series of estimations is that both the national savings and capital inflow variables are estimated with positive and, in most cases, statistically significant coefficients.<sup>31</sup> In the first place, these results highlight the importance of the two factors as

determinants of business investment in the ECE emerging market economies. No less importantly, as argued in box 1, they provide strong evidence of the fact that the business sector in these economies does face serious financing constraints, which affect – and probably distort – investment decisions.

The estimation results for all the ECE emerging market economies, as well as those for eastern Europe taken separately, suggest that financial intermediary development (as measured by the level of monetization of the economy) is another factor that has had a strong positive effect on investment performance.<sup>32</sup> However, this effect was not present in the estimation results for the CIS region taken separately (an outcome discussed below). Finally, institutional factors (in this case approximated by the EBRD index of “progress in transition”) also play an important role in the shaping of investment. The estimation results suggest that the strengthening of the institutional environment has a positive effect on investment activity in these economies.

Separate estimations of the equations for eastern Europe and the CIS provide insights into some differences between the determinants of investment in these two subregions. Notably, the statistical association between investment and current output growth is much weaker among the CIS countries; if at all, the investment dynamics is more affected by past performance (the lagged GDP growth rate). The possible prevalence of backward-looking expectations over forward-looking ones in the shaping of investment decisions could also mean higher investor uncertainty about the future. In contrast, the investment dynamics in eastern Europe is strongly associated with both current and past output performance, with forward-looking expectations likely to be playing a more important role.

These results imply that the investment dynamics in the CIS are shaped mostly by factors other than expected output growth. Thus the estimated coefficient of the capital inflow variable (the largest coefficient by absolute value for the CIS, and much larger than for eastern Europe) suggests that business investment in this region is to a large extent driven by capital inflows. This interpretation fits well with the composition of investment in the CIS discussed in the previous section, which highlights the leading role of investment in resource-extracting industries. The estimation results provide further evidence in support of the conjecture that foreign-driven investment in the resource-oriented sectors in the CIS shapes, to a large extent, the overall investment dynamics in many countries of this region.

Another difference between the two subregions is related to the role of financial intermediation. While the estimation results highlight the importance of financial intermediation as a driver of investment activity in eastern Europe, this does not seem to be the case in the CIS.<sup>33</sup> Two possible complementary interpretations of this result can be suggested. In the first place, it may reflect both the underdeveloped financial systems and the low efficiency of financial intermediation in many of the CIS economies. Financial systems in these countries have to reach a certain depth before there can be a positive association between investment and financial intermediation. Reaching this threshold level may be a necessary precondition for achieving efficiency gains in financial intermediation. And secondly, it may be a side-effect of the dominating role of foreign capital inflows; their channelling into investment is not directly associated with the depth of domestic financial intermediation.<sup>34</sup>

### **III. Conclusions and policy implications**

The empirical analysis presented in this paper offers some new insights into the relationships between savings, investment and economic growth in the ECE emerging market economies. Both the overview presented in section I and the results of econometric analysis discussed in section II highlight the fact that some of the main driving forces of savings, investment and growth in these economies are at least partly associated with policy-driven developments. Therefore the results of this analysis have important policy implications.

It is a well-established notion that increasing the mobilization of domestic resources (in particular, savings) for productive use can be an important factor for economic development and sustainable economic growth. This should therefore be among the long-term policy priorities of the ECE emerging market economies, especially those among them that still face serious development challenges. Ironically, some of these countries (in particular, some of the resource-rich CIS countries)



in recent years have been net exporters of savings, which could be interpreted as foregone domestic investment opportunities. The eventual reversal of these trends could undoubtedly enhance the future growth potential of these economies, provided these resources are channelled into productive investment.

The economic literature emphasizes the dual nature of the long-term relationship between national savings, capital formation and economic growth: on the one hand, higher rates of national savings and productive investment can feed into a faster pace of economic growth; on the other hand, robust growth induces higher rates of national savings and capital formation. The importance of the dual nature of these relationships is their inbuilt potential to set in motion a virtuous cycle of higher saving and investment rates, and higher trend growth. A key policy-related question is: what can public policy do to stimulate economic growth and/or domestic savings/investment, in order to trigger such a virtuous cycle? The econometric analysis of the determinants of business investment in the ECE emerging market economies provides several possible clues to this question.

This analysis indicates that firms in the ECE emerging market economies face financing constraints that can affect (and possibly distort) their investment decisions. Such constraints may arise from scarce domestic financial resources or major imperfections in domestic financial markets, or both. Thus, eliminating or reducing these constraints would have a positive effect on business investment, which, in turn, could feed into higher rates of future growth. As argued throughout the paper, one of the key factors in this regard is the development and efficiency of financial intermediation. Moreover, the econometric analysis of the determinants of aggregate business investment suggests the existence of threshold effects in financial development: financial deepening has to reach a certain level before the financial system can play an efficient intermediation role in channelling savings into productive investment. The eastern European economies have likely reached this threshold, and financial intermediation is at present an important driver of investment activity in these countries. By contrast, in most CIS countries financial intermediation does not seem to be a major determinant of business investment so far.

The empirical evidence presented in the paper points to a strong positive relationship between national savings and business investment, which suggests that policies that stimulate national savings will at the same time have a positive effect on business investment.<sup>35</sup> Similarly, these results suggest a strong positive relationship between the attracted foreign capital inflows and the level of business investment in this group of countries. Thus, creating an environment that is conducive to the mobilization of foreign capital obviously can also play an important role in increasing the overall levels of domestic productive investment.

Furthermore, the results highlight the importance of the institutional environment for the level of investment activity (by both domestic and direct foreign investors) in these economies. The institutional environment is also an area that is directly subject to policy intervention. Factors such as the strength of the judiciary (including its role in contract enforcement and the protection of property rights), adherence to a clear and transparent regulatory framework, and the promotion of fair competition in the domestic markets can have a strong positive effect on investors' decisions. This is especially important for countries that are less advanced in the process of economic transformation.

Overall, the domestic financial system emerges as one of the central factors for the efficient channelling of savings into growth-enhancing investment. Hence, assigning a high priority to financial reforms in the ECE emerging market economies, especially in those that have not made sufficient progress in this area, may have a mutually reinforcing effect on domestic savings and investment. This may be one of the key factors for triggering a virtuous cycle of high domestic savings and investment rates and accelerating growth in these economies.

## ANNEX TABLE

Saving-investment balances in selected ECE emerging market economies, 1998-2003  
(Per cent of GDP)

	1998	1999	2000	2001	2002	2003		1998	1999	2000	2001	2002	2003
<b>Bulgaria</b>							<b>Lithuania</b>						
Gross domestic investment ...	16.9	17.9	18.3	20.7	19.8	21.7	Gross domestic investment ...	25.6	22.5	19.6	20.5	21.7	22.4
Government .....	4.1	4.8	4.2	4.0	3.2	3.6	Government .....	3.2	2.2	1.9	1.9	3.1	3.4
Non-government .....	12.8	13.1	14.1	16.6	16.6	18.2	Non-government .....	22.4	20.2	17.6	18.6	18.6	19.0
Gross national savings .....	17.1	12.1	12.9	13.1	13.2	12.0	Gross national savings .....	14.0	12.3	13.2	15.1	16.2	16.6
Government .....	5.4	5.0	3.6	5.7	2.5	3.6	Government .....	0.1	-3.4	-0.8	-	1.4	1.3
Non-government .....	11.7	7.2	9.3	7.4	10.7	8.4	Non-government .....	14.0	15.7	14.0	15.1	14.8	15.4
Foreign savings .....	-0.2	5.8	5.4	7.6	6.6	9.8	Foreign savings .....	11.5	10.1	6.4	5.4	5.6	5.8
Government balance .....	1.3	0.2	-0.6	1.7	-0.7	-	Government balance .....	-3.1	-5.6	-2.7	-1.9	-1.7	-2.1
Non-government balance .....	-1.1	-6.0	-4.8	-9.3	-5.9	-9.8	Non-government balance .....	-8.4	-4.5	-3.7	-3.5	-3.9	-3.7
<b>Croatia</b>							<b>Poland</b>						
Gross domestic investment ...	24.0	23.0	20.2	23.9	28.4	30.4	Gross domestic investment ...	24.6	24.9	24.7	20.7	18.9	18.7
Government .....	5.8	5.7	3.5	5.4	6.0	6.3	Government .....	3.4	2.9	2.9	2.9	2.9	3.2
Non-government .....	18.2	17.4	16.8	18.5	22.4	24.1	Non-government .....	21.2	22.0	21.8	17.8	16.0	15.5
Gross national savings .....	14.5	14.6	15.1	17.9	19.1	20.7	Gross national savings .....	19.7	18.9	18.1	17.1	15.5	16.2
Government .....	2.8	-1.8	-2.4	-1.4	1.2	1.7	Government .....	1.1	1.4	1.1	-0.2	-0.9	-0.7
Non-government .....	11.7	16.4	17.5	19.3	17.9	19.0	Non-government .....	18.5	17.5	17.0	17.3	16.4	16.9
Foreign savings .....	9.6	8.4	5.1	6.0	9.3	9.7	Foreign savings .....	4.9	6.0	6.5	3.7	3.3	2.5
Government balance .....	-3.0	-7.4	-5.9	-6.8	-4.8	-4.6	Government balance .....	-2.3	-1.5	-1.8	-3.1	-3.8	-3.9
Non-government balance .....	-6.5	-1.0	0.7	0.8	-4.5	-5.1	Non-government balance .....	-2.6	-4.5	-4.7	-0.6	0.5	1.4
<b>Czech Republic</b>							<b>Romania</b>						
Gross domestic investment ...	28.5	26.9	28.8	28.9	27.9	27.6	Gross domestic investment ...	17.7	16.1	19.5	22.6	23.5	24.6
Government .....	4.7	4.8	5.0	4.8	5.3	6.3	Government .....	3.6	2.8	3.0	3.1	3.2	3.6
Non-government .....	23.8	22.2	23.8	24.0	22.6	21.3	Non-government .....	14.1	13.3	16.4	19.4	20.3	21.0
Gross national savings .....	27.4	25.8	25.7	26.3	25.9	25.4	Gross national savings .....	9.7	11.2	13.8	14.8	17.8	16.7
Government .....	0.2	1.6	1.7	-0.7	-1.4	-0.3	Government .....	0.4	-1.7	-1.5	-0.3	1.0	2.1
Non-government .....	27.2	24.2	24.0	27.0	27.3	25.7	Non-government .....	9.3	13.0	15.3	15.1	16.8	14.6
Foreign savings .....	1.1	1.2	3.1	2.5	2.0	2.2	Foreign savings .....	8.0	4.8	5.6	7.8	5.7	7.9
Government balance .....	-4.5	-3.2	-3.3	-5.5	-6.7	-6.6	Government balance .....	-3.2	-4.5	-4.5	-3.4	-2.2	-1.5
Non-government balance .....	3.4	2.0	0.2	3.0	4.7	4.4	Non-government balance .....	-4.8	-0.3	-1.1	-4.4	-3.5	-6.4
<b>Estonia</b>							<b>Slovakia</b>						
Gross domestic investment ...	30.2	25.0	27.9	29.2	31.8	31.1	Gross domestic investment ...	34.0	27.6	26.1	30.0	29.3	25.3
Government .....	4.1	4.1	3.0	3.0	3.6	3.6	Government .....	5.3	3.8	5.5	3.6	4.2	3.7
Non-government .....	26.1	20.8	24.9	26.2	28.2	27.6	Non-government .....	28.7	23.7	20.6	26.4	25.1	21.5
Gross national savings .....	20.4	20.4	24.0	25.7	24.7	23.1	Gross national savings .....	23.3	23.2	23.7	21.8	22.2	23.8
Government .....	3.7	0.1	2.6	3.2	4.9	4.8	Government .....	0.6	-2.6	-7.3	-2.0	-3.0	-1.3
Non-government .....	16.7	20.2	21.5	22.5	19.8	18.3	Non-government .....	22.8	25.8	31.0	23.8	25.2	25.0
Foreign savings .....	9.8	4.6	3.8	3.5	7.1	8.0	Foreign savings .....	10.7	4.4	2.5	8.2	7.1	1.5
Government balance .....	-0.4	-4.0	-0.4	0.2	1.3	1.2	Government balance .....	-4.7	-6.4	-12.8	-5.6	-7.2	-5.0
Non-government balance .....	-9.4	-0.6	-3.4	-3.7	-8.4	-9.3	Non-government balance .....	-6.0	2.0	10.3	-2.6	0.1	3.5
<b>Hungary</b>							<b>Slovenia</b>						
Gross domestic investment ...	28.9	28.7	30.9	26.8	25.2	25.1	Gross domestic investment ...	24.7	27.3	26.7	23.9	23.8	25.3
Government .....	3.6	3.3	3.3	3.6	3.1	2.3	Government .....	4.1	4.3	4.0	4.2	3.9	4.1
Non-government .....	25.2	25.4	27.6	23.3	22.1	22.9	Non-government .....	20.7	22.9	22.6	19.7	19.9	21.2
Gross national savings .....	27.4	26.0	27.0	25.3	22.9	20.8	Gross national savings .....	23.3	23.1	23.1	23.2	25.2	25.3
Government .....	-4.4	-2.0	0.3	-0.5	-6.1	-3.5	Government .....	1.8	2.1	0.8	1.7	1.5	3.0
Non-government .....	31.8	28.0	26.7	25.8	29.0	24.3	Non-government .....	21.5	21.0	22.3	21.5	23.7	22.3
Foreign savings .....	1.4	2.7	3.9	1.5	2.3	4.3	Foreign savings .....	1.4	4.2	3.5	0.7	-1.5	-
Government balance .....	-8.0	-5.3	-3.0	-4.1	-9.2	-5.8	Government balance .....	-2.3	-2.2	-3.2	-2.5	-2.4	-1.1
Non-government balance .....	6.6	2.6	-0.9	2.6	6.9	1.5	Non-government balance .....	0.9	-2.0	-0.3	1.8	3.9	1.1
<b>Latvia</b>							<b>The former Yugoslav Republic of Macedonia</b>						
Gross domestic investment ...	24.1	23.2	23.4	26.9	26.8	28.8	Gross domestic investment ...	22.3	19.7	21.4	18.3	19.7	..
Government .....	3.7	4.2	3.7	3.5	3.8	3.8	Government .....	1.8	2.4	3.4	4.3	3.7	3.6
Non-government .....	20.4	19.0	19.8	23.4	23.0	25.0	Non-government .....	20.4	17.3	18.0	14.0	16.0	..
Gross national savings .....	11.6	13.7	15.4	16.5	17.1	16.1	Gross national savings .....	7.4	9.7	7.4	5.2	0.5	..
Government .....	3.0	-1.1	1.0	1.9	0.8	1.8	Government .....	-	0.9	5.2	-2.9	-1.9	1.1
Non-government .....	8.6	14.8	14.4	14.6	16.3	14.3	Non-government .....	7.4	8.8	2.2	8.0	2.4	..
Foreign savings .....	12.4	9.5	8.0	10.4	9.7	12.7	Foreign savings .....	14.9	10.0	14.1	13.1	19.2	..
Government balance .....	-0.7	-5.3	-2.7	-1.6	-3.0	-2.0	Government balance .....	-1.8	-1.5	1.8	-7.2	-5.7	-2.5
Non-government balance .....	-11.7	-4.2	-5.3	-8.8	-6.7	-10.7	Non-government balance .....	-13.1	-8.5	-15.8	-6.0	-13.5	..

(For source and notes see end of table.)

## ANNEX TABLE (concluded)

Saving-investment balances in selected ECE emerging market economies, 1998-2003  
(Per cent of GDP)

	1998	1999	2000	2001	2002	2003		1998	1999	2000	2001	2002	2003
<b>Armenia</b>							<b>Kyrgyzstan</b>						
Gross domestic investment ...	19.1	18.4	18.6	19.8	21.7	24.7	Gross domestic investment ...	15.4	18.0	20.0	18.0	17.6	16.2
Government .....	5.0	4.7	3.9	3.9	4.7	5.7	Government .....	6.6	10.5	8.1	5.3	5.9	4.5
Non-government .....	14.2	13.7	14.7	15.8	16.9	19.0	Non-government .....	8.9	7.6	11.9	12.7	11.7	11.7
Gross national savings .....	-14.7	-10.7	-8.5	-0.9	4.4	6.8	Gross national savings .....	-6.1	3.2	14.3	17.7	13.8	12.0
Government .....	-	-2.7	-2.4	0.1	2.3	2.5	Government .....	-2.9	-1.5	-1.8	-0.2	-0.4	-0.1
Non-government .....	-14.7	-8.0	-6.1	-1.0	2.1	4.3	Non-government .....	-3.2	4.8	16.1	18.0	14.2	12.0
Foreign savings .....	33.8	29.0	27.2	20.7	17.2	17.9	Foreign savings .....	21.5	14.8	5.7	0.3	3.8	4.2
Government balance .....	-4.9	-7.4	-6.3	-3.8	-2.4	-3.2	Government balance .....	-9.5	-12.0	-9.9	-5.5	-6.3	-4.6
Non-government balance .....	-28.9	-21.7	-20.8	-16.8	-14.8	-14.7	Non-government balance .....	-12.0	-2.8	4.2	5.3	2.5	0.4
<b>Azerbaijan</b>							<b>Republic of Moldova</b>						
Gross domestic investment ...	33.4	26.5	20.7	20.7	34.6	51.2	Gross domestic investment ...	25.9	22.9	23.9	23.3	21.7	21.7
Government .....	1.8	3.7	3.0	3.5	5.6	6.1	Government .....	2.3	0.8	1.1	1.1	1.1	0.9
Non-government .....	31.5	22.8	17.7	17.1	29.0	45.1	Non-government .....	23.6	22.0	22.9	22.2	20.5	20.8
Gross national savings .....	1.5	12.6	22.5	24.9	27.3	29.7	Gross national savings .....	-0.9	10.0	-3.0	-1.1	-3.3	-8.8
Government .....	-	-1.4	1.7	4.7	5.2	5.8	Government .....	-8.3	-4.5	-1.7	0.5	-1.7	-1.2
Non-government .....	1.6	14.0	20.7	20.1	22.1	23.9	Non-government .....	7.5	14.5	-1.3	-1.6	-1.5	-7.7
Foreign savings .....	31.8	13.9	-1.8	-4.2	7.3	21.5	Foreign savings .....	26.8	12.9	27.0	24.4	24.9	30.5
Government balance .....	-1.9	-5.1	-1.3	1.2	-0.4	-0.4	Government balance .....	-10.6	-5.3	-2.8	-0.5	-2.9	-2.1
Non-government balance .....	-30.0	-8.8	3.1	3.0	-6.9	-21.2	Non-government balance .....	-16.2	-7.6	-24.2	-23.8	-22.0	-28.4
<b>Belarus</b>							<b>Russian Federation</b>						
Gross domestic investment ...	26.7	23.7	25.4	23.8	22.2	24.1	Gross domestic investment ...	15.0	14.8	18.7	21.9	20.2	20.6
Government .....	3.0	2.2	1.9	1.5	1.2	1.5	Government .....	7.2	5.8	3.4	4.6	5.8	5.6
Non-government .....	23.8	21.5	23.5	22.3	20.9	22.7	Non-government .....	7.8	9.0	15.3	17.4	14.4	15.0
Gross national savings .....	21.9	21.3	22.2	20.2	18.4	20.2	Gross national savings .....	21.6	31.9	38.7	34.6	30.7	32.0
Government .....	2.0	0.2	1.7	-0.4	-0.5	0.5	Government .....	1.6	4.2	6.1	7.6	6.4	7.3
Non-government .....	19.9	21.1	20.5	20.6	19.0	19.7	Non-government .....	20.0	27.6	32.6	27.0	24.3	24.7
Foreign savings .....	4.9	2.4	3.2	3.5	3.7	4.0	Foreign savings .....	-6.7	-17.0	-20.0	-12.7	-10.6	-11.4
Government balance .....	-1.0	-2.0	-0.2	-1.9	-1.8	-1.0	Government balance .....	-5.5	-1.6	2.7	3.0	0.6	1.7
Non-government balance .....	-3.9	-0.4	-3.0	-1.7	-2.0	-3.0	Non-government balance .....	12.2	18.6	17.3	9.6	9.9	9.7
<b>Georgia</b>							<b>Tajikistan</b>						
Gross domestic investment ...	21.0	22.1	21.7	21.9	22.1	24.4	Gross domestic investment ...	15.4	17.3	11.6	16.6	17.9	..
Government .....	1.3	0.9	0.5	1.1	1.1	1.2	Government .....	2.8	3.4	6.6	5.0	5.4	5.6
Non-government .....	19.7	21.2	21.2	20.8	21.0	23.2	Non-government .....	12.6	13.9	5.0	11.6	12.5	..
Gross national savings .....	0.4	3.0	4.9	7.5	9.6	9.8	Gross national savings .....	7.6	18.8	21.8	14.6	18.7	..
Government .....	-5.5	-5.8	-4.2	-0.9	-1.2	-0.1	Government .....	-1.0	0.3	6.0	1.9	2.6	1.8
Non-government .....	5.9	8.9	9.2	8.3	10.8	9.9	Non-government .....	8.6	18.5	15.8	12.7	16.1	..
Foreign savings .....	20.6	19.0	16.7	14.5	12.5	14.6	Foreign savings .....	7.8	-1.5	-10.2	2.0	-0.8	..
Government balance .....	-6.8	-6.7	-4.7	-2.0	-2.2	-1.3	Government balance .....	-3.8	-3.1	-0.6	-3.2	-2.8	-3.7
Non-government balance .....	-13.8	-12.3	-12.0	-12.5	-10.2	-13.3	Non-government balance .....	-4.0	4.6	10.8	1.2	3.6	..
<b>Kazakhstan</b>							<b>Ukraine</b>						
Gross domestic investment ...	15.8	17.8	18.1	26.9	27.3	26.6	Gross domestic investment ...	20.8	17.4	19.7	21.8	20.2	20.3
Government .....	2.2	1.4	1.6	2.8	3.3	3.6	Government .....	1.6	1.3	2.1	3.1	2.2	2.4
Non-government .....	13.6	16.4	16.5	24.1	24.0	23.0	Non-government .....	19.2	16.2	17.6	18.7	18.0	17.9
Gross national savings .....	11.3	20.1	26.7	26.0	28.2	32.8	Gross national savings .....	18.5	23.0	24.7	23.4	24.6	22.9
Government .....	-5.8	-3.6	0.9	5.5	4.8	7.6	Government .....	-0.8	-1.0	1.0	2.2	2.7	2.8
Non-government .....	17.1	23.8	25.8	20.4	23.4	25.3	Non-government .....	19.4	24.0	23.7	21.3	21.9	20.1
Foreign savings .....	4.5	-2.3	-8.6	0.9	-0.9	-6.2	Foreign savings .....	2.3	-5.5	-5.0	-1.6	-4.4	-2.6
Government balance .....	-8.0	-5.0	-0.8	2.7	1.4	4.0	Government balance .....	-2.5	-2.3	-1.1	-0.9	0.5	0.4
Non-government balance .....	3.5	7.3	9.3	-3.6	-0.5	2.3	Non-government balance .....	0.2	7.8	6.1	2.5	3.9	2.2

Source: UNECE secretariat, based on national statistics.

Note: For methodology, see text.

## Notes

- <sup>1</sup> United Nations, *Report of the International Conference on Financing for Development* (Monterrey, Mexico), 18-22 March 2002 (A/Conf.198/11) (United Nations publication, Sales No. E.02. II.A.7), 2002.
- <sup>2</sup> UNECE, “Domestic savings in the transition economies”, *Economic Survey of Europe, 2001 No. 1*, chap. 4, pp. 167-183.
- <sup>3</sup> For an overview of the relevant literature, see UNECE, *ibid.* For a comprehensive review of various related topics, see also K. Schmidt-Hebbel and L. Serven (eds.), *The Economics of Saving and Growth: Theory, Evidence, and Implications for Policy* (Cambridge, Cambridge University Press, 1999).
- <sup>4</sup> S. Cesaratto, “Savings and economic growth in neo-classical theory”, *Cambridge Journal of Economics*, Vol. 23, No. 6, 1999, pp. 771-793.
- <sup>5</sup> The collection of essays by K. Schmidt-Hebbel and L. Serven (eds.), *op. cit.*, systematically suggests a strong positive correlation between savings and growth across a broad cross-section of countries.
- <sup>6</sup> C. Carroll, J. Overland and D. Weil, “Saving and growth with habit formation”, *American Economic Review*, Vol. 90, No. 3, June 2000, pp. 341-355.
- <sup>7</sup> This is the so-called Feldstein-Horioka puzzle, named after Martin Feldstein and Charles Horioka who were the first economists to report this finding. M. Feldstein and C. Horioka, “Domestic saving and international capital flows”, *Economic Journal*, Vol. 90, No. 358, 1980, pp. 314-329. For a discussion, see UNECE, “Saving-investment balances and capital mobility”, *Economic Survey of Europe, 2001 No. 1*, pp. 48-52, and UNECE, “Domestic savings in the transition economies”, *op. cit.*
- <sup>8</sup> For an overview of the channels and mechanisms through which financial development affects economic growth, see R. Levine, “Financial development and economic growth: views and agenda”, *Journal of Economic Literature*, Vol. 35, No. 2, June 1997, pp. 688-726.
- <sup>9</sup> W. Branson, *Macroeconomic Theory and Policy* (New York, Harper & Row, 1972), pp. 395-397.
- <sup>10</sup> A. Hatemi and M. Irandoust, “Investigating causal relations between fixed investment and economic growth”, *Economia Internazionale/International Economics*, Vol. 55, No. 1, February 2002, pp. 25-35.
- <sup>11</sup> K. Schmidt-Hebbel, L. Serven and A. Solimano, “Saving and investment: paradigms, puzzles, policies”, *World Bank Research Observer*, Vol. 11, No. 1, February 1996, pp. 87-117.
- <sup>12</sup> Among the first studies that revealed the existence of this relationship were: R. Summers, I. Kravis and A. Heston, “International comparisons of real product and its composition: 1950-1977”, *The Review of Income and Wealth*, Series 26, No. 1, 1980, pp. 19-66; and R. Summers and A. Heston, “The Penn World Tables (Mark 5): an extended set of international comparisons, 1950-1985”, *The Quarterly Journal of Economics*, Vol. 106, No. 2, May 1991, pp. 327-368. These outcomes have been corroborated in more recent studies based on pooled time series of country data that explicitly take into account the existing heterogeneity across countries. S. Bond, A. Leblebicioglu and F. Schiantarelli, *Capital Accumulation and Growth: A New Look at the Empirical Evidence*, Nuffield College, University of Oxford, Economics Papers (Oxford), No. 2004-W08, March 2004.
- <sup>13</sup> E. Podrecca and G. Carmeci, “Fixed investment and economic growth: new results of causality”, *Applied Economics*, Vol. 33, No. 2, February 2001, pp. 177-182.
- <sup>14</sup> A. Hatemi and M. Irandoust, *op. cit.*
- <sup>15</sup> S. Devarajan, H. Pack and W. Easterly, *Is Investment in Africa Too Low or Too High? Macro and Micro Evidence*, World Bank Policy Research Working Papers, No. 2519 (Washington, D.C.), January 2001.
- <sup>16</sup> The aggregated national saving-investment balance is derived from the national accounts identity and, in a simplified version (neglecting net transfer payments to the rest of the world), takes the following form:  $S-I = X-M$ , where  $S$  stands for gross national savings,  $I$  denotes gross domestic investment (or gross capital formation, as per the System of National Accounts (SNA), while  $M$  and  $X$  denote imports and exports of goods and services, respectively. The balance of trade in goods and services ( $X-M$ ) reflects the level of foreign savings mobilized to finance the national saving-investment gap.  
Differentiating between the government and the non-government sectors, the national saving-investment balance can also be rewritten as:  $(S_g - I_g) + (S_n - I_n) = X - M$ , where subscripts  $g$  and  $n$  stand for government and non-government, respectively. For the full derivation, see UNECE, “The arithmetic of the national saving-investment balance”, *Economic Survey of Europe, 2001 No. 1*, p. 172, box 4.3.1.
- <sup>17</sup> Saving-investment balances for years prior to 1998 are available in UNECE, “Domestic savings in the transition economies”, *op. cit.*
- <sup>18</sup> This was due entirely to the weakening of this statistical association for the groups of CIS countries, whereas in eastern Europe it remained intact. The coefficient of correlation between domestic savings and investment for eastern Europe was 0.61 for the period 1990-1996 and 0.65 for the period 1997-2003; for the CIS, the corresponding value was 0.76 for 1990-1996 and there was practically no correlation for 1997-2003.

- <sup>19</sup> Here and later in this paper the reported regional or subregional averages refer to the unweighted averages for the corresponding groups of countries.
- <sup>20</sup> The coefficient of correlation for the whole group of countries presented in the chart is only 0.13. The observed relatively high cross-country dispersion most probably reflects the still high output volatility in these immature markets.
- <sup>21</sup> The ratios in the annex table refer to the share of gross capital formation in GDP, including investment in fixed capital and the changes in stocks.
- <sup>22</sup> The upturn of the average CIS investment ratio in 2003 was due exclusively to the very high investment rate in Azerbaijan that year.
- <sup>23</sup> The EBRD index is a composite measure that combines several groups of factors such as enterprise development (including progress in privatization and governance), progress in establishing efficient markets (including price liberalization and competition policy), development of financial institutions and infrastructure development.
- <sup>24</sup> This high level of uncertainty is largely related to the specificities of the institutional environment (e.g. the stability and predictability of the legal and regulatory framework, the degree of protection of property rights and the power of law enforcement).
- <sup>25</sup> A. Dixit and R. Pindyck, *Investment Under Uncertainty* (Princeton, Princeton University Press, 1994); K. Schmidt-Hebbel, L. Servén and A. Solimano, op. cit.
- <sup>26</sup> Admittedly, the monetization ratio is only a crude proxy for both financial depth and efficiency of financial intermediation. Moreover, the quality of financial intermediation may differ, even in countries of similar financial depth, due to differences in the institutional environment. The impact of these factors should be at least partly captured by the EBRD index of “progress in transition”.
- <sup>27</sup> The estimation technique was a panel estimation (performed on an unbalanced panel) with fixed effects, which allows accounting for country-specific, time invariant effects. In the estimation, preference was given to the use of generalized least squares with cross-section weights, an estimation method that takes into account (and corrects for) the presence of cross-section heteroscedasticity related to the clustering of the residuals along cross-sections. When applying such techniques, possible endogeneity effects and reverse causality should be taken into account with respect to the variables entering the specification, which may result in an estimation bias. In the model used, endogeneity effects are most likely to be seen with respect to domestic savings. One way of circumventing the simultaneity bias is to use appropriate instrumental variables. In this case, the instruments used were the level of real GDP per capita at purchasing power parity (PPP) (which is clearly an exogenous variable to this model) as well as the lagged value of the savings ratio. Table 7.3.2 presents the estimation results both of the original and instrumented variables. Correcting for possible simultaneity in this case has some effect on the results, but does not change them dramatically. One could also suspect endogeneity effects and reverse causality between investment and output growth. However, the causality link from investment to growth discussed in the previous section is essentially a long-term relationship (as the effects show up with a lag which may be rather lengthy), whereas the model used here is one of short-term investment dynamics. Thus, in the model discussed in box 1, output growth is treated as an exogenous variable, reflecting the firm’s demand conditions; accordingly, the aggregate model incorporates the same assumption. Nevertheless, partial simultaneity between the short-term dynamics of output and investment cannot be fully ruled out.
- <sup>28</sup> These results underscore the importance of the causal relationship from output growth to investment performance in the short run.
- <sup>29</sup> However, this outcome may also reflect the fact that the interest rate on credit is only a crude approximation of the true cost of capital, which would be the theoretically correct variable.
- <sup>30</sup> Relevant interest rate data were available only for a shorter time period.
- <sup>31</sup> In the estimations where instrumental variables were used for domestic savings, this effect was even more pronounced.
- <sup>32</sup> Similarly, in the estimations with instrumented domestic savings, this effect was more pronounced.
- <sup>33</sup> The estimated coefficients for this variable in the case of the CIS were not only statistically insignificant but also negative in some cases, an outcome that does not have a clear economic meaning. For this reason, the financial intermediation variable was excluded from the specifications for the CIS.
- <sup>34</sup> Yet a third possible factor may be related to differences in the way the state interferes in the domestic financial markets (the “crowding-out” effect). However, this factor is beyond the explanatory scope of the model used.
- <sup>35</sup> On policies to raise domestic savings, see also UNECE, “Domestic savings in the transition economies”, op. cit.